

Cost and Management

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ORGANIZATION AS A FACTOR IN REDUCING COSTS

By BRUCE PAYNE 95

A Graduate of the University of California and the Harvard Graduate School of Business Administration, Mr. Payne is President and Director of Bruce Payne & Associates, Management Consultants, Westport, Connecticut; New York City, Boston, Chicago, and Atlanta. He is also President of Bruce Payne and Associates International Inc., which does management counselling outside the United States and maintains offices in Montreal and Rio de Janeiro, Brazil. He is a member of many professional societies and is at present President of the Society for Advancement of Management. This article by Mr. Payne and the paper by Mr. Meyers appear in *Cost and Management* through the courtesy of N.A.C.A.

COST CONTROL FOR MAINTENANCE LABOUR

By GEORGE E. MEYERS 104

Mr. Meyers is a Maintenance Specialist with offices in Waban, Massachusetts. He specializes in budgeting, the control and reduction of maintenance costs, preventive maintenance and maintenance incentives. Mr. Meyers began his business career with Procter and Gamble in Cincinnati in 1916. Later he became associated with Ernst & Ernst, Boston, and after serving twenty-four years with this firm, he resigned so that he might pursue activities which were exclusively confined to the maintenance field.

MECHANIZATION OF THE OFFICE

By R. C. LUDLOW 111

Treasurer of R.C.A. Victor Company, Limited, Montreal, Mr. Ludlow was born and educated in Toronto, and joined R.C.A. Victor in Toronto in 1934. Until 1947 when he was appointed Treasurer, Mr. Ludlow held various positions ranging from Manager, Office Services to General Credit Manager. His present duties include administration of the company's financial and credit policies, internal audit and clerical methods functions. Mr. Ludlow is active in a number of management associations and is a Past President of the Montreal Chapter of N.O.M.A.

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Editorial Comment . . .

Ne Quid Nimis — A Bit More On Replacement Cost Accounting

Although one should beware of exhausting a theme by playing it too often, we cannot overlook the fact that no month can pass by without more contributions being made to the discussion on the basis for calculating depreciation of fixed assets.

The February 1954 issue of *The Canadian Chartered Accountant* starts with an editorial "A Pronouncement on Replacement Price Accounting". The editorial highlights the fact that although the A.I.A. Committee on Accounting Procedure in the U.S.A. and the Institute of Chartered Accountants in England and Wales in the United Kingdom have taken stands against calculating depreciation of fixed assets on the basis of replacement costs, the Society of Incorporated Accountants and Auditors in England issued a positive statement on the subject on January 2nd, 1954. This statement is reproduced in the quoted editorial and recommends that accounts prepared on the revaluation of fixed assets of a continuing business should be accepted as long as this basis is clearly stated. It is interesting to note that this pronouncement of the Council recommends, among others, "that any provision for deficiencies in past depreciation charges brought about by subsequent rises in price levels should only be met by appropriations out of profit already determined."

Even leading newspapers, not usually concerned with accounting problems, devote considerable space to our problem. A recent example is the *Christian Science Monitor* which printed an editorial on the financial page recently under the heading "Policy on Depreciation by U.S. Held Outmoded". This editorial comments on the result of the depreciation rates imposed by the Bureau of Internal Revenue in the United States since 1934; "The result in the last 20 years, according to the Machinery and Allied Products Institute (M.A.P.I.), is that the over-all rated average of rates allowed on fixed corporate assets is to-day under 5% per year, except for such as are subject to special amortization." Apparently, the quoted Institute is just publishing a book on depreciation which criticizes severely the present day policy on allowing depreciation in the United States. According to this publication "the total of depreciation allowances for tax purposes understates true capital consumption by almost \$7 billion annually. In a decade, such assets acquired earlier at lower prices than now prevail would be undervalued by about \$70 billion because of the deficiency in accrued depreciation, even if no further price increases occur." We can only agree with the conclusion the study reaches that this is a tremendous sum. The *Christian Science Monitor* of course goes wrong by concluding that "true depreciation is an amount annually charged off which, at the end of a stated period will procure in tangible assets the equi-

EDITORIAL COMMENT

valent of the original number of dollars expended for the asset in question." Although we cannot agree with this statement, the further criticism voiced by M.A.P.I. deserves attention: M.A.P.I. criticizes the Revenue Bureau's policy of insisting on group depreciation accounting because this method, according to M.A.P.I., aggravates the retardation brought about by the straight line depreciation policy.

This seems to parallel a comment in the February 1954 *Tax Review* included in the February issue of *The Canadian Chartered Accountant*. In an article under the heading "Depreciation Allowance Under the Canadian Income Tax", J. Harvey Perry, Executive Director, the Canadian Tax Foundation, comments that "the diminishing balance plan is not accepted as being appropriate in many cases, and the virtual compulsion to use it for company accounts because it is used under the income tax meets strong objection from most accountants. The retention of an asset in the account for depreciation purposes after it has been sold or scrapped at a loss is also contrary to sound accounting practice."

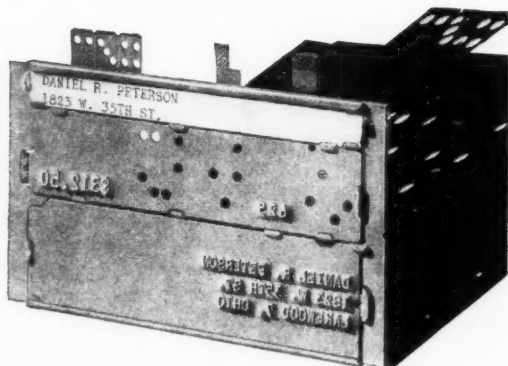
In the light of the statements included in the quoted article that "for 1945 and 1946 the rate of write-off expressed as a percentage of buildings and equipment at the values reported to the Taxation Division is estimated to be about 3.59%; for 1951 the comparable rate is about 5.79% or about 61% higher" the results of the survey now undertaken by the Legislation Committee of our Society on the possible effect of replacement depreciation accounting in Canada promises to be most interesting.

NOTICE OF EXAMINATION DATES

The dates for the 1954 Examinations have been set as follows:

Accounting I	Monday, April 26th
Fundamentals of Cost Accounting	Tuesday, April 27th
Advanced Cost Accounting (Paper I)	Wednesday, April 28th
Accounting II	Thursday, April 29th
Business Mathematics	Friday, April 30th
Advanced Cost Accounting (Paper II)	Saturday, May 1st
Industrial Organization and Management	Monday, May 3rd
Industrial Legislation	Tuesday, May 4th

Application forms and information concerning the time of examinations, may be obtained from the Registrars of the Provincial Societies.



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C & M Round-Up . . .

By N. R. BARFOOT, R.I.A.

Immigration

This may be the biggest year yet in numbers of new Canadians from foreign lands. The minimum target for 1954 is 167,000. This was the actual figure for 1953. 1951 showed the highest number (194,000) of the post-war years.

Canada certainly needs more population and although there are some soft spots in employment, a careful selection of immigrants with trade skills suitable for expanding industries is highly desirable.

Nearly 25,000 new jobs were created in 1953 compared to 19,000 in 1952. Most of these were the result of new factories.

Each new immigrant brings at least two consumers in addition to himself.

We must not forget the rapid strides of the American economy under the influence of its 19th century immigration policy.

Life Insurance

What happens to Life Insurance money? Here are some interesting figures based on 1953:

Canadians owned 20.5 billions of Life Insurance at the end of 1953. This was twice the amount in force in 1945.

The per capita figure is \$1,370.00.

New business in 1953 was 2.5 billions.

Life Insurance Companies invested 350 millions in housing in 1953 or nearly 25% of their assets in Canada.

Over 70 companies, Canadian, British and American operate in this competitive area.

Death claims and benefits amounted to 265 millions.

Automobiles

The following figures really prove the contentions of sociologists who claim Canadians are growing more and more nomadic:

During 1953, 486,000 auto units were produced, 53,000 more than the previous year.

Of the big three, General Motors produced 219,967

Ford produced 155,627

Chrysler produced 79,091

Total employment of the three top auto corporations was 38,000 with a payroll of 146 millions.

All 5 major companies have completed or are planning extensive additions to present manufacturing facilities.

Telephones

The Bell Telephone reports that 2,120,000 phones are now in service.

150,000 were put into use in 1953.

COST AND MANAGEMENT

80% of all phones are dial operated — an interesting sideline reveals that this is a higher ratio than the United States.

Long distance calls average 250,000 daily; local calls about 13 million a day.

Stocks On The Installment Plan

With the lack of large unit investor capital there has been some concern over capital supply for the future. Since bank deposits and individual earnings were never higher, perhaps the above plan is not so far away from reality. Here is how it works:

The New York stock exchange is the first to try the new system.

An investor may pay as little as \$40.00 every three months or as much as \$999.00 per month.

The plans are for periods of one to five years.

For example, a person investing \$40.00 per month in a \$20.00 share stock would be credited with 2 shares after each payment.

If each payment is less than a single share price or a fraction more, the investor is credited with the exact portion of a share or shares and fractions of a share covered by the payment.

Obviously a lot of record keeping is necessary but can be most expeditiously handled by those brokerage concerns specializing in odd lots of stock.

The American investment houses believe that this is a better plan than buying shares in a mutual funds company who purchase a variety of stocks for protection. This remains to be seen.

Vending

In case you are unaware of it, a new multi-million dollar business has quietly come upon the scene. A few figures tell the amazing story:

There are 10,000 automatic vending machines in Canada dispensing everything from soft drinks to tennis balls.

15 millions in sales were recorded through vending machines last year.

A breakdown of the number of machines by type last year shows:

Cigarettes	2,500 machines
Bottle Type Soft Drink	5,000 machines
Cup Type Soft Drink	600 machines
Candy Bar	500 machines
Coffee	250 machines
Miscellaneous	1,100 machines

These machines digest nickels, dimes, quarters and coppers, reject slugs and return proper change.

(Continued on Page 87)

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COST AND MANAGEMENT

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(Continued from Page 86)

Most of to-day's vending machine business in Canada is in the hands of small owner operators who personally service from a dozen to 100 outlets.

The average machine pays for itself within 18 months and lasts about 5 years.

Location commission rates range up to 25% of the gross take. Materials and service costs amount to 65% and the balance is profit.

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THE ACCOUNTANT AS AN EXECUTIVE, by J. N. Laurenson — *The Accountants' Journal* — Nov. '53.

ACCOUNTING

ACCOUNTING IN MANAGEMENT ENGINEERING, by Victor A. Lim — *The Accountants' Journal* — Dec. '53.

ACCOUNTING IN PERIODS OF RAPID INFLATION AND DEFLATION, by E. S. Owens — *The Chartered Accountant in Australia* — Dec. '53.

FUTURE OF ACCOUNTING IN MANAGEMENT, by Daniel M. Braum — *The Accountants' Journal* — Dec. '53.

ACCOUNTS

BUSINESS MANAGEMENT THROUGH ACCOUNTS by Hans Menzi — *The Accountants' Journal* — Dec. '53.

ASSETS, FIXED

EQUIPMENT REPLACEMENT POLICY — AND APPLICATION, by E. Martin, Sr. — *N.A.C.A. Bulletin* — Feb. '54 — Sec. 1.

AUDITOR

SOME AUDITING DOUBTS AND DIFFICULTIES, by James T. Dowling — *The Accountants' Magazine* — Jan. '54.

BANKS AND BANKING

BANK ADMINISTRATION THROUGH THE BALANCE SHEET, by Alfonso Calalang — *The Accountants' Journal* — Dec. '53.

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ECONOMIC AND ACCOUNTING CONCEPTS IN BREAK-EVEN ANALYSIS, by Lester Ageloff — *The N.Y. Certified Public Accountant* — Jan. '54.

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RETURN ON CAPITAL EMPLOYED — MEASURE OF MANAGEMENT, by F. J. Muth — *N.A.C.A. Bulletin* — Feb. '54 — Sec. 1.

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WORKING CAPITAL, by A. N. Stevens — *The Australian Accountant* — Dec. '53.

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EXPEDITING CONTRACT TERMINATION CLAIMS, by J. G. Gaither — *N.A.C.A. Bulletin* — Jan. '54 — Sec. 1.

CONTROLLER

EXECUTIVE INCENTIVE COMPENSATION AND THE CONTROLLER, by Arch Patton — *The Controller* — Feb. '54.

COST CONTROL

HELPING THE FOREMAN CONTROL COSTS, by R. E. Stockmeyer — *N.A.C.A. Bulletin* — Feb. '54 — Sec. 1.

COSTING

COSTING TECHNIQUES — THEIR EFFECT ON MANAGEMENT PRACTICE AND POLICY, by David Solomons — *The Cost Accountant* — Jan. '54.

COST AND MANAGEMENT

COST REDUCTION

BLUEPRINT FOR COST REDUCTION — FACTORY MANAGEMENT AND MAINTENANCE — Jan. '54.

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ANOTHER LOOK AT DEPRECIATION ALLOWANCES, by R. K. Mautz and L. Griffith — The Controller — Jan. '54.

EDUCATION AND TRAINING

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FARMS AND FARMING

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TECHNIQUES OF FINANCIAL ANALYSIS FOR MANAGEMENT PLANNING, by Editorial Staff — The Journal of Accountancy — Feb. '54.

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THE LEARNING CURVE AS A PRODUCTION TOOL, by Frank J. Andress — *Harvard Business Review* — Jan. - Feb. '54.

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PROCEDURE FOR "COERCING" AGREEMENT, by Irving J. Lee — *Harvard Business Review* — Jan. - Feb. '54.

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THE STOCK EXCHANGE, by W. C. Buchanan — *The Accountants' Magazine* — Jan. '54.

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The Accountants' Journal, 22 Bedford Sq., London WC1, England.
The Harvard Business Review, Soldier's Field, Boston 63, Mass.
Business Management, 100 Simcoe St., Toronto 1, Ont.
The Controller, 1 East 42nd St., New York 16, N.Y.
The Accountants' Journal, 100 Lambton Quay, Box 5043, Wellington, N.Z.
Factory Management and Maintenance, 330 W. 42nd St., New York 36, N.Y.

PERSONALS

J. E. Coubrough, R.I.A., recently received promotion to Chief Accountant and Treasurer of the Hamilton Hydro Electric System. A member of the Hamilton Chapter, Mr. Coubrough was appointed to this position upon the elevation of Mr. J. W. Hammond to General Manager.

R. F. Cummings, a Director of the St. Maurice Valley Chapter has been appointed Supervisor of Accounting and Methods at Shawinigan Chemicals Limited, Shawinigan Falls.

L. A. C. Donaldson, R.I.A., of the Vancouver Chapter, has entered public practice as a consultant and has established offices at 808 Standard Building, 510 West Hastings St., Vancouver.

George Moller, D.Jur., C.A., R.I.A., has been elected a Director of Erie Flooring and Wood Products Limited, West Lorne, Ontario. Mr. Moller is Secretary-Treasurer of the Hamilton Chapter and Treasurer and Comptroller of Robertson-Irwin Limited, Hamilton.

D. B. Peddie, R.I.A., a member of the St. Maurice Valley Chapter and a Director of the National Society, has been appointed Chief Plant Accountant for Shawinigan Chemicals Limited, its subsidiaries and associated companies. Mr. Peddie will be located in the Montreal Head Office of the Company.

J. Albert Vezina, C.A., R.I.A., C.G.A., has been appointed Provincial Auditor for the Province of Quebec. A member of the Quebec Chapter of the Society, Mr. Vezina succeeds another Quebec Chapter member, Mr. A. J. Dolbec, who recently retired.

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Organization as a Factor in Reducing Costs . . .

By BRUCE PAYNE,

President, Bruce Payne & Associates, Incorporated,
Management Consultants, Westport, Connecticut.

Competition demands a continuous attack on administrative and production costs. An effective programme of cost reduction must stem from an efficient organization at the executive level. In approaching this problem, the author draws attention to the need for analyzing all aspects of executive responsibility, the necessity of a sound management training programme, and the methods which can be used in attaining these objectives.

A SUCCESSFUL organization, to-day, must be able to reduce costs continually. It must recognize the new trends and new demands of industrial operation, and take advantage of the new techniques and procedures developed during the past few years. The tempo of business development is accelerating, and will continue to do so, placing an ever-greater strain on management.

Many organizations are not able to meet these trends and demands because many of their management men are already overworked and overloaded. Under to-day's emergencies, laws, prices, taxes and competition, the executive and manager must run as fast as he can just to stay in the same place. He will mention such new problems as extremely rapid company expansion to meet defence and civilian needs; the opening of foreign markets and foreign plants; and the need for new sales and production ideas.

Despite all of these problems, it is not only possible to build a sound company foundation for future profits, but to do it without increasing the load of the individual executive. As a matter of fact, decreasing the executive load, without increasing the size of the top management staff, should be one of the major results of this effort. These are, indeed, far-reaching objectives, but the results achieved by one good sized equipment manufacturer through a determined organizational effort and follow-up is, however, evidence of what can be done. An analysis of this company indicated the following major problems:

1. Costs were no better than competitors'.
2. There was no second team for the older key executives.
3. All executives were overworked.
4. The industry and its suppliers had developed little new equipment, processes or materials, and this company had not done development work of its own.
5. The union was holding work loads to half a "fair day's work."
6. Sales were seasonal and cyclical.

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It was evident that there were several reasons for these problems:

1. The industry and all the companies in it had settled into a status quo.
2. The union was not looking to the future when other products would offer this industry serious competition. There were already indications of new products being offered more cheaply and being sold more vigorously.
3. New industrial techniques of production and sales had not been considered.

When the weaknesses had been determined by a complete management examination, the company went to work to improve. First, this company's objectives were more clearly defined. The work of each man on the executive team was studied in order that the burden could be reduced to safe proportions. Younger assistants were given more to do to help the top executives, and, as a result this added responsibility gave them experience to develop as a second team of executives. In the plant, new production methods and techniques based upon the accurate measurement of productive work, were studied and applied. Fair work assignments were achieved by production incentives. Improved sales and production controls were worked out to assist executives in meeting company sales objectives. With all the executives working together, this company had reduced costs below any other company in the industry within three years. It has continuously sold 100% of its productive capacity for this period — the only company in its industry to do so. Gross and net profit percentages are better while the other companies have found it difficult to maintain the old profit level.

Periodic checks over the last four years have insured that the organization is maintained and improved on a continuing basis. The company has always been the leader in its field, but there is now no question in anyone's mind that it has moved further in front of competition, and will stay the leader. This company now has modern methods and the flexibility to anticipate change, plus reserve power to meet new developments. Its executives form a competent team, operating at top effectiveness.

Company Preparations for To-day's Problems

The first step in preparing any company to meet to-day's ever-changing problems is a thorough survey and study of the situation as it now exists. What are the company's objectives? What does it want to accomplish in terms of production, sales, profits, expansion and development of new products? Who are the people who must accomplish these objectives? How many executives are there to-day? What do they do? What should they do? How old are they? Who are their potential replacements?

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With this information at hand, the real effort to improve company organization can begin. It involves setting up a workable organization plan, defining the duties and responsibilities of each department and each executive, and developing a method for measuring executive performance. A great deal of painstaking work and careful consideration is required to achieve each of these goals. Just as a tree that has been growing in the wrong direction, a company cannot just be pushed back on the right path. It must be re-organized and the personnel re-trained.

In making a survey of an organization with the objective of lower costs, a great many factors must be considered. A few of the more important factors which will serve to indicate the scope of the problems involved and the need for an independent, objective approach will be discussed.

Executive Functions

American executives are becoming the most overworked and harrassed group of men in history. When a company is properly organized, and executive functions correctly apportioned, this overload can be almost completely eliminated without increasing the executive staff.

One management study after another has indicated that a major cause of the overload is that executives are spending a large proportion of their time on non-executive functions or jobs which can and should be performed by other employees. Department heads are doing things clerks could do better. Vice-presidents tinker with the production problems that rightfully belong to the engineer. Presidents are usurping the duties of accountants.

For instance, the president of a large company was complaining not long ago about being overloaded with work, when the telephone rang. It was one of his plant managers in another city asking if that plant should continue the small contribution to the community fund which had been customary for some years. They discussed it for fifteen minutes and was it worth the time? It was not. But the president simply did not know how to delegate authority.

Many times an independent, but overeager, executive will take unto himself duties which are not rightfully his, and which he may not be able to fulfill at a later date. Here is an example: The controller of an electronics manufacturer had a well-staffed organization who were eager to do any and all kinds of service work. As a result of this eagerness, the manager of tabulating had taken unto himself the record-keeping, as well as the operations of many of the employee services, such as Insurance, Vacations, Leaves of Absence. The records were extremely accurate, but were not available for the personnel manager when one of the questions might come up. Furthermore, by saddling himself with so many extra functions, the manager of tabulating was unable to keep pace with his regular work. One pay increase which

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had been negotiated with the union was more than three months in getting into the pay envelope.

Thus, an important step in building a good executive organization is making sure the jobs to be done by executives are management jobs. This may seem obvious, but, surprisingly, many executives are completely unaware of the non-essential and detail work done by them which should either be eliminated, or be performed by others.

How can one decide what an executive should delegate to others, and what is a function suitable for him to perform? Actually, the decision is not difficult. A man making an annual salary of \$40,000. is being paid \$20 an hour. What letters and what decisions will still be profitable if that much money is spent in handling them? Going back to the donation situation, for instance, a small contribution certainly is not worth consideration by a \$40,000-a-year man for an hour or even a half-hour just on the basis of plain mathematics, let alone two men and the telephone being tied up.

One company, which recently surveyed the jobs of its executives, found that they were spending more than half of their time on non-managerial duties.

In another company, a few months after the president retired, the executive vice-president died, and the plant superintendent had to go on a part-time schedule because of health. The new top executives, promoted from within, found themselves working fourteen to sixteen hours a day, seven days a week, and getting mired deeper and deeper. A study of the situation revealed, however, that many of the functions could be passed to lower echelons, or made less demanding. Eighteen months later, output had doubled and costs were down. Yet no new executives had been added, and the top executives were able to work a normal work week. There is no secret to discovering the non-management functions performed by an executive. A complete and detailed list of what he does, a careful check on the various items, a shifting to others of less important functions, and the executive will have more time, a cleaner desk, and less strain. He will also have a much sharper view of his primary job.

Training Programme for Executives

Perhaps some executives are "born", but most have to be "made". They need training in effective methods of leadership, and in co-ordination of the work of others. A "school for policy makers" may seem strange, yet, it is needed in most companies, in every kind of business and industry. It is the best way to help key men to discover, without friction, hard feeling and resentment, exactly where their responsibilities begin and end, and perhaps more important, it provides them with the knowledge of the scope of their fellow executives' duties.

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An executive training course is particularly important for men entering the executive group, such as technicians who are promoted to the executive staff.

The case method has been successfully used in executive training programmes. Executives on the same level are carefully chosen for each class, and are given the complete background and objectives of the training in advance. They are, in fact, "sold" on the idea, since they are not apt to be eager at first.

A trained leader, usually from outside the company, is found to conduct the discussions. The cases are built up from actual situations confronting the company, or apt to confront it in the near future. The best results are obtained by holding sessions for several consecutive days in a classroom away from the plant because only then can the "students" get into the spirit of the training, away from the press of every-day work.

Companies which have tried the case method have been enthusiastic. The "graduates" for the most part agree that their horizons have been broadened and their sympathies enlarged by looking at the other fellow's point of view. They have a new sense of the importance of persuading people to work with them rather than for them.

Here is an example of the case method of instruction, as applied to industrial relations: The workers of a mid-west manufacturer had been organized by a militant union, and all levels of management were faced with completely new responsibilities. Although copies of the contract had been distributed and interpretations had been made, there was considerable misunderstanding between stewards and certain executives. The director of labour relations instituted a course for all executive personnel. The outstanding and best training medium was a re-enactment of a grievance procedure. This was a case which the union had won, and which was generally misunderstood by management. By participating in actual "role-playing" the executives were able to get the feeling of the original participants and by making their own determinations from the contract, were better able to understand the decision. In their appreciation for the company-union contract, and for the human relations involved, the executives were then able to continue to improve production methods and employee output.

There are many formal training courses which are given to executives by universities and colleges. Such a course is the Advanced Management Programme of the Harvard Business School. This course, which lasts for thirteen weeks, has been eminently successful as judged by the number of companies who continue to send executives for training. In-plant training, however, is equally important.

Executive Authority

This is one of the most critical and least understood areas of management. There are many frustrated executives who have been given a

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job to do without the proper authority to follow through. For example, there is the man ordered to build up sales volume, but refused an advertising appropriation; the controller ordered to set up new cost controls, who can't hire a clerk; the harrassed production executive, who can't replace obsolete machinery. Proper and full delegation of authority is the key to an executive's success. Most executives think they know how important clear authorization is; but few achieve it without help.

In one company, a junior executive was asked to examine the methods and install modern techniques in five operating departments for which he was responsible. He surveyed, analyzed, and drew up an excellent blueprint. The department heads, formidable characters in this company, received no "official" notice to co-operate. The junior executive was given no authority to insist, so the department chiefs quite courteously ignored his recommendations. A year's work was wasted.

An executive will have the authority he needs to do a proper job only when the area of his responsibility has been carefully defined, when the flow of authority has been intelligently charted, and when all executives have been trained in the principles of good organization. When executives know their jobs and take for granted that they will not be hamstrung by conflicting commands and ill-defined directives, every facet of company operation is smoother and easier. Delegation of authority must include a clear definition of the areas of responsibility. Mere delegation is not enough. Although authority may be bestowed from those above, it must be earned from those who are supervised. Authority will not be recognized by subordinates unless it is deserved.

Executive Standards and Incentives

Standards and incentives for plant workers have become fairly common practice in American industry as a means of increasing production. It is difficult to understand how accomplishment can be measured unless there are standards of some sort. Yet, only a few companies have well defined standards of performance for executives, and executive incentive programmes based upon precise standards are even more rare.

It is possible, however, to establish realistic performance standards for executives. For example, standards can be based upon the operating budgets for key personnel. A sales budget, established by careful market analysis will determine the sales volume and profit objectives the sales manager must achieve. The sales budget will assist the sales manager in planning and in monitoring his sales costs. The standard for the sales manager is his sales budget, and the measurement of sales results against this standard is the measurement of his performance.

Before standards of executive performance can be established, all the other factors of sound organization must be in operation. No executive can be judged fairly if he is overburdened with non-

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management functions; if he does not have adequate authority, or if he is not properly trained in leadership and technical know-how. Given these, standards can and should be developed and compensation should be adjusted fairly to them. Thus, production executives can be rewarded against a production budget and cost standards; promotion people, by the effectiveness of their advertising.

The performance of other executives will be measured against company objectives. The treasurer or financial vice-president has objectives in meeting financial plans, borrowing funds on favorable terms, and maintaining credit criteria. The executive vice-president and president have more general objectives to meet such as maintaining or improving the competitiveness of the company, labour and community relations, and maintaining a flexible and growing organization.

Naturally, monetary incentives are important. One of America's foremost companies has shown a profit for 21 consecutive years under the direction of the same able chief executive. He has encouraged extra production bonuses for everyone, from the sweeper to the executive vice-president. Several executives earned incentives of 100% or more. The responsibilities for results are up to each man and when he succeeds, the reward is found in his bank account. This practice has unquestionably played a big role in the company's success.

There are also other incentives which may be even more important than money in stimulating an executive to greater effort. Fuller participation in the making of top policy, for example, encourages an executive to try to make it succeed. Recognition for work well done is a splendid incentive.

One young man of 30 inherited a good-sized textile firm when his father died five years ago. He also inherited a group of executives much older than himself. However, he was a master at recognizing achievement, and actually has developed a harder-hitting team than the one his father left him. This young man's techniques included encouraging key executives to participate in national association conferences, where they gained industry-wide recognition of their achievements. He sponsored and publicized their community activities. He encouraged them to join social clubs and commended them for their efforts in enhancing the company's reputation through their broadened activities.

Executives are really human beings and they respond immediately when they have earned a pat on the back, and get it.

Conclusion

Several areas which should be covered in developing an organization which will reduce costs have been discussed. Other areas which could be discussed would include executive selection, personal work methods of executives, the techniques and tools of administration, production

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and sales, developing the second team, and, of course, organizational flexibility for continual company development. The human and personal aspects of executive growth exist in all of these areas. And yet, these still are only a few of the many points that must be covered in building and maintaining an effective organization. It cannot be emphasized too strongly that it is the complete organizational plan that accomplishes the results of low costs.

It is not only difficult, but almost worthless to attempt to patch up weakness in an organization just by adding an executive training programme or an executive counselor. Only through a complete study and organization effort which finds and fixes all the sources of costs can real advantages be gained. Furthermore, organization is not a "one shot" job. To keep the gains which are made, follow-through and periodic rechecks of organizational planning are essential.

To whom should the responsibility for building and maintaining this cost-conscious organization be delegated? Certainly, it should be someone who has a broad knowledge of management problems, and can view them with complete objectivity. A few of the biggest companies — duPont, General Motors, General Electric—have established management consulting groups within their own organizations to provide objectivity to organizational planning. Because of their size, these companies can afford to support such staff groups, and can set them up so that they are in a position to be fairly objective. In many other organizations, outside counsel is used effectively for organizational objectivity.

To-day's cost problems demand flexibility of organization. The entire company must be alive to progress and change. Thus, no plan, however good, can be allowed to become stagnant. Management must, therefore, provide for a continual study of all phases of its organization. With this approach to organization, and with effective provision for following it through, management can readily be in a position to meet the difficult and ever-changing requirement of these times, and to insure continued progress in the years ahead.

Ditto Of Canada And Ditto Incorporated Appointments

Stanley J. Burk has been elected Vice-President, Ditto of Canada Limited and Vice-President and Director of Ditto (Quebec) Limited. Mr. Burk will continue in the capacity of General Manager of the Canadian companies.

A Director of the Canadian organization and formerly Vice-President of Ditto of Canada Limited, Larry A. Watkins has been appointed Vice-President in Charge of Sales, Ditto, Incorporated, Chicago, Illinois.



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Cost Control for Maintenance Labour...

By **GEORGE E. MEYERS**,
Maintenance Specialist,
Waban, Massachusetts.

The Standard Hour Control Plan of controlling maintenance activities is discussed by the author in this article. He outlines the development and operation of the plan and shows how it assists in scheduling work, promotes accurate man-hour and material costs, develops Standard Hour standards; and provides for the establishment of a wage incentive programme.

PLANT operating managers recognize, that to secure maximum machine utilization, they must give careful consideration to the maintenance and repair of plant facilities. In order to achieve the desired utilization of plant operating equipment, a planned maintenance control programme must be developed.

A large portion of maintenance cost consists of the Maintenance Division payrolls. Maintenance labour, in many industries, is excluded from the usual labour cost control programme. In general, this type of labour is uncontrolled because it does not seem to lend itself to control by the methods ordinarily applied to other labour.

It has been our experience that, because of the vast areas covered by maintenance workers and the variable nature of their work, considerable dissipation of time develops. Since there is a lack of direct supervision, and because time is consumed in going to and from jobs, supply rooms, workrooms, etc., maintenance labour costs are usually large and should be under adequate control. The plan to be discussed deals primarily with the principles of maintenance labour cost control.

Features and Advantages of the Standard Hour Control Plan

The salient features and advantages provided by the plan are:

1. A complete record of work performed and the actual hours expended for each maintenance task.
2. A measuring medium which provides fair and equitable pre-determined standard times to perform all types of maintenance work.
3. The accumulation of weekly performance reports for use by Management as a measure of the Maintenance Department effectiveness.
4. The development of a preventive maintenance programme.

Type of Work Covered by the Plan

The following job classifications, which are normally headed by a Plant Engineer or Maintenance Superintendent, are ordinarily included under this method of control:

Carpenters; Electricians; Pipefitters; Machinists; Painters; Labourers.

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Maintenance work usually falls into four classifications: Routine jobs which recur at scheduled intervals and are authorized in the form of standing repair orders; Repetitive jobs; Non-repetitive jobs; Estimated jobs.

Development of Clerical Procedures

In order to establish predetermined standards for the first three classifications of maintenance work, it is necessary to follow definite procedures for a sufficient period (usually three to eight months) prior to the development of Standard Hour standards.

A written order should be prepared for every request for maintenance work. These orders should all clear through the plant engineer's office. A review of the orders enables the plant engineer to determine their justification. Further, he can schedule the work in the sequence of importance and utilize the workers' time to the best advantage.

The form of order is of no great importance so long as the necessary data is furnished. It is important that a complete description of the work to be done should be given, including the order number, date, equipment number, name and location in the plant and signatures of the person requesting the work, the person approving the work and the worker responsible for completing the work.

The number of copies of the order will vary to meet individual plant requirements. The order discussed here is prepared in four copies. These orders originate in the Productive and Maintenance Departments. After the order is written, the first three copies should be forwarded to the plant engineer's office and the fourth copy retained by the originator of the order.

The maintenance control clerk in the plant engineer's office detaches the number three copy and places it in numerical sequence in a file of unfinished orders. The number one and two copies are sent to the clerk in the various craft shops, where they are placed in the "Jobs Not Started" file.

In the event that more than one craft is involved in the work requested on the order, extra copies of the number one and two copies should be prepared in the engineering office and sent to the respective craft offices. When the extra copies of the order are prepared in the plant engineer's office, the total number of such orders issued, including the original order, should be noted on the order form.

When a job is assigned to a workman, the number one and two copies are removed from the "Jobs Not Started" file. The number two copy is immediately filed in numerical sequence in a "Jobs In Process" file. The clerk or timekeeper gives the workman the number one copy and at the same time rings in the worker on his daily work ticket. The

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order number of the job to which the workman is assigned is recorded on the worker's daily work ticket.

The worker will keep the white copy of the order until the work is completed. He will then have it approved by the proper authority and, after signing his own initials, will return this copy to the craft office clerk. The clerk will ring out the employee on the worker's daily work ticket, at which time the worker is assigned another job. The elapsed time taken on each job is completed and posted on the daily work ticket.

The craft office clerk removes the number two copy from the "Jobs In Process" file. He will then post the date the job was completed on both copies and hold them in a completed file.

At the end of each day the total time on the daily work tickets is compared with the workmen's attendance clock cards and any discrepancies reconciled.

The number one and two copies of all completed orders and the daily work tickets for the day are forwarded to the plant engineer's office.

The control clerk in the plant engineer's office posts the elapsed time for each job, as indicated on the daily work tickets, in the space provided on the back of the number three copy of the order. When the number one and two copies of the order are received from the craft shop, it is his notification that the job is completed. The hours are totalled on the reverse side of the number three copy and also posted on the face of the number one and two copies. At the completion of each day's work, the number one, two and three copies of completed orders will be sorted.

The number one copies are sorted by departments to be charged and held in a file until the end of the week. Total actual hours of each group of these orders are then totalled on an adding machine tape. The tapes are attached to the orders and sent to the department head for whom the work was done.

This procedure is considered to be one of the most important features of the plan, as it gives the various department heads an opportunity to carefully check the time expended on all the orders originated by them. Close examination of the charges by the department heads is in itself a control procedure which is very valuable. Charges which, in their opinion, are out of line should be brought to the attention of the plant engineer.

The number two copies are then filed in the plant engineer's office by crafts and date sequence.

The number three copies are filed by type of equipment.

Although this discussion deals primarily with the principles of maintenance labour control, it is important to mention, at this time, that

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the plan also provides for the control of maintenance materials and supplies.

Control of materials can be reasonably assured if the following principles of control are applied:

Stock rooms in which physical quantities of materials and supplies are stored should be secured under lock and key.

A stock inventory record should be maintained showing the quantities received, issued, and balance on hand for all major items. This is a quantity record only; therefore, it is not necessary to carry money values on this record.

The type of material requisition used will vary with individual requirements. It can be a separate requisition or be included as a part of the order form herein discussed.

Establishment of Standards

When a sufficient number of orders is accumulated, a complete and detailed analysis is made to determine the cost of the various classifications or orders, expressed in man-hours.

The number two copies of the orders, which are filed by crafts, are used for this purpose. The development of standards is accomplished by analyzing the maintenance work, by crafts, into four general classifications, which are:

Routine jobs; Repetitive jobs; Non-repetitive jobs; Estimated work.

Following these classifications, budgeted standards for routine work are determined.

All repetitive jobs are classified by crafts and respective job name and standards established, based on the man-hour cost for the development period.

With respect to non-repetitive jobs, the approach is somewhat different. One of the unusual features of this plan is the complete coverage of this type of maintenance work which has always appeared difficult to measure. Our plan provides for placing non-repetitive work in time classifications, by crafts. Usually four or five major classifications are sufficient for complete coverage of this type of work, although there may be more or less, depending on existing conditions.

Time standards for estimated jobs, which consist primarily of new construction projects or major repairs, are estimated at the time of authorization.

These standards are expressed as Standard Hour standards. Standard Hour standards, therefore, are the number of hours per unit or job which are allowed for the task.

Measuring Employee Effectiveness

Following the establishment of Standard Hour standards, they are currently applied to all completed orders.

The number two copies of the orders completed each week will be passed to a standards computation clerk by the maintenance control

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clerk, after the posting of the actual hours to the face of this copy.

The standards clerk will sort the orders for each maintenance group into routine, repetitive, non-repetitive and estimated jobs. Standard Hour standards, as previously established, are applied so that Standard Hours are obtained.

Standard Hours represent the value of the work performed and are the product of the Standard Hour standards times the number of units or jobs actually completed.

Standard Hours and Actual Hours for the foregoing classifications for each maintenance group are totalled for the period, and the performance for each group determined.

Group performance is determined by dividing the total Standard Hours by the total Actual Hours and multiplying this result by 100. In other words, it is the percentage of Standard Hours to Actual Hours.

Standard Hour Control Report

Information is now available for the preparation of the Standard Hour Control Report.

This report is prepared each week for a given pay period. Totals of Actual and Standard Hours are posted to the summary sheet, thus indicating the performance attained by the various groups and the Maintenance Division as a whole.

Inasmuch as the Standard Hour standards are established on actual man-hour costs over a given period, it is the intent of the plan to control the future activities of the maintenance workers so that lower man-hour costs will result. The percentages of performance that are reflected weekly on the Standard Hour control report will indicate whether the Maintenance Department effectiveness is increasing or decreasing.

It is not expected that a comparison of Actual and Standard Hours for any specific week will reflect a true performance for that period. There will always be instances when estimated or major repair jobs will extend over a period of several weeks before they are completed. This would naturally distort the relationship of Actual and Standard Hours in any given week. Therefore, the effectiveness of the maintenance groups should be based on an eight-week moving average so as to effect a more consistent trend of performance. This merely means the accumulation of eight weeks' Actual Hours and Standard Hours in one total, with a resultant percentage of performance.

Preventive Maintenance Programme

In general, maintenance departments are burdened with a backlog of maintenance rush jobs.

This condition can readily be improved by the development of definite preventive maintenance procedures.

Preventive maintenance promotes low operating costs and, therefore, plant facilities should receive regular inspections to minimize the failure of equipment and machines.

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Inspection schedules can be laid out to cover all the equipment in the plant. Predetermined schedules of inspection should be prepared and should indicate:

1. The name and number of the equipment to be inspected.
2. The type of inspection each piece of equipment requires.
3. The frequency with which each item of equipment shall receive the required inspection.
4. The condition of the equipment at the time of inspection.
5. Preparation of inspection schedules for each department, by type of inspection, for each day of the week.

The cost of operating a preventive maintenance schedule, as outlined, will be repaid many times through the elimination of costly major repair jobs, a decrease in production equipment downtime, and a better balanced work load for the Maintenance Departments.

Wage Incentive Programme

The Standard Hour standards established for control purposes also form the basis for wage payment under an incentive plan.

There are important advantages to be gained by the application of an incentive programme for maintenance work. An interested worker is an effective worker and, as such, his attainment with respect to quality and quantity of work is high. The surest way to secure operator interest is to provide compensation in proportion to expended effort. Therefore, satisfactory operator effort can be realized under a plan which provides for extra pay in return for effective operation. In other words, as the degree of performance increases, the operator's pay increases in proportion.

Hence, in order to obtain full benefits of the plan through greater employee interest and better utilization of time, the installation of a wage incentive programme is recommended.

Application of the Incentive Programme

Extra compensation shall result only when the performance percentage, as computed by the application of Standard Hour standards, exceeds 100% for a given eight-week period.

As previously stated, the effectiveness of maintenance groups should be based on an eight-week moving average. The percentage of performance for the eight-week period can be used for the current week's premium percentage. The following week, the first week of the eight-week period can be eliminated and the new current week added, so that at all times we have eight-week totals involved and yet are enabled to have a current week's percentage upon which to compensate employees.

The employee's share of added compensation is based on the performance of each department and the Maintenance Division as a whole. This means that one-half of the employee's share will be paid on the indicated departmental increase, and one-half as a result of the over-all Maintenance Division increase. The purpose of this manner of payment

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is to provide a more equal distribution of the percentage of added compensation and to stimulate employee co-operation, together with greater interest in maintenance improvement.

It is exceedingly simple to operate the incentive plan. No changes in clerical procedures are necessary, except for such added payroll percentage computations as will be required in connection with additional compensation.

Summary

There are, of course, varying conditions between different types of industry, and it is impossible to set forth a plan which will meet the need of each and every plant. The basic pattern of this plan, however, can be readily adapted to fit the condition of any manufacturing enterprise.

A review of some of the more important features, which make it possible to control all types of maintenance repair and installation work, follows:

1. Provision for a written order for every request for maintenance work. These orders all clear through the plant engineer's office. This procedure enables the plant engineer to determine their justification, schedule the work, and to utilize the workers' time to the best advantage.
2. Provides an accurate man-hour cost for each and every maintenance job and the cost of materials used on each job.
3. Development of Standard Hour standards with which to control the elapsed time taken to do the work.
4. Preparation of weekly performance reports for use by Management as a measure of each maintenance craft effectiveness and the Maintenance Division as a whole.
5. The development of a preventive maintenance programme to eliminate costly major repair jobs, reduce production equipment downtime and provide a better balanced work load.
6. Provision for a real incentive whereby employees can increase hourly earnings through co-operative effort and Management benefit by reduced operating costs.

The application of the principles of maintenance control, as outlined herein, cannot be endorsed too strongly. It has not been uncommon in Maintenance Departments, where either an effective control or incentive plan has been applied, that the productivity of maintenance workers has increased from 25% to 50%. This increase clearly brings out the fact that generally the dissipation of maintenance employees' time not only exists, but is of large proportions. The substantial results ordinarily obtained gives Management a splendid return on the initial investment of the installation cost. The cost of maintaining the programme after its installation is negligible. Therefore, Management can take full advantage of the economies obtained.

Mechanization of the Office . . .

By R. C. LUDLOW,
*Treasurer, R.C.A. Victor Company Limited,
Montreal, Quebec.*

Although the office has become more highly mechanized in recent years, it never has matched the technological achievements of the factory. In surveying the present state of office mechanization, the author offers some very constructive suggestions for determining machine applications in the office. In commenting on future developments, he stresses the importance of electronics and the effect that this innovation will have on the status of the office worker.

NOT too many years ago, the proportion of clerical workers to direct production was a rather minor factor. Now that proportion has risen to a point where, in many organizations, it is a matter of great concern. Official 1952 employment figures show that 17% of all workers in industry were clerical workers.

The rate of growth is somewhat illusory. This illusion is produced by a relative decline in the number of production people, as against the upward trend in office staff. The decline in the factory in relation to output is the result of mechanization; the growth in the office is caused by a number of factors. As production becomes more mechanized, the need for control procedures increases; as management becomes more scientific, the office becomes the nerve centre without which the enterprise would be lifeless or incapable of co-ordinated action. To-day's office worker, too, may be less productive than his predecessors — although that is a matter for conjecture only, so long as an adequate means of measuring clerical performance is lacking. Finally, a significant factor is the load now borne by the office in performing the many activities demanded by governmental decree — the collection of income tax, of sales and excise taxes, of unemployment insurance, and so on.

When any element of cost swells to unreasonable proportions, it is essential to the healthy life of the enterprise that remedial action be taken. Mechanization is undoubtedly the most effective remedy available for the office.

Present Status of Mechanization

To-day's office is equipped with a wide variety of machines and mechanical devices. There are for example: Typewriters, Dictating Equipment, Adding and Calculating Equipment, Timing Devices, Addressing Machines, Printing Machines, Counting Machines, and there are many more.

Initially, most of these devices were conceived for a single function. The ingenious manner in which various types of office machines are now being linked-up in combination indicates that management is aware of the urgent need for placing office operations on a continuous-flow basis. Typewriters are now being used to produce punched tapes, which in turn actuate other machines. Printing equipment, ordinarily not thought

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of as accounting machinery, now is the initiator of many accounting systems through the use of re-usable masters, which effectively produce a chain of related forms from one writing. Addressing machines, originally intended for a limited purpose, have developed accounting applications. Dictating machines, because of recent trends toward greater portability and flexibility, are now used in physical inventory work, the counts being dictated for transcription later. Telephone systems are being employed for automatic transmission of data. Even the commonplace card file has been mechanized to disgorge wanted information electrically. Photography is now an accounting tool, many concerns using this process to reduce their financial statements to pocket size. And, of course, punched card equipment, which more than any other machine, typifies the true principle of mechanized accounting, continues to make major advances.

Determination of Machine Applications

A common thread of purpose runs through all the descriptions of mechanized applications in use in to-day's office: the elimination of re-writing of data. Or, to put it another way, the development of a continuity of clerical operations to achieve an unbroken flow. There are other purposes, of course, such as elimination of fatigue, reduction of errors, removal of monotonous manual effort, which are important additional objectives. In the final analysis, however, all these purposes point to one common end result: the operation of the office on a profitable basis.

The office is a complete business within itself. Its raw material is the mass of data which pours into it from all segments of the organization; its tools; the forms, equipment and machinery with which it processes the raw material; its finished product, the data through which the organization is controlled and guided in its future course; its profit, the value by which its output outweighs its cost.

As a complete business operation, the office must learn from the factory all the techniques of economical and efficient production. The vast output of to-day's industrial machine could never have been attained by man-power alone. Mechanization, basically, has been the cause. The extent of mechanization in production is illustrated vividly by the investment in plant and equipment, which in many industries represents thousands of dollars per worker. In the old days of craftsmanship the worker had to supply his own tools; in modern operations, very few workers could afford to do so.

Mechanization of the office can be just as effective as mechanization of the factory, but mechanization of the office must be planned. In many instances, machine applications would be totally unjustified. The fact that a machine exists for performing a given task doesn't necessarily mean that its use is indicated in every instance.

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The particular needs of the industry and the benefit of the results to be obtained from the task, may not justify a machine installation. Machines do not always produce the most economical output. Quite often, a manual operation will be found to be the most effective from all considerations. It is most important to make a careful and accurate determination of the need for any office appliance. Although the recommendations of friends, the use of the appliance by competitors or the skilful presentation of the appliance salesman should not sway this decision, these opinions can sometimes assist in making the decision because of the difficulty of making a trial run of a machine installation. There are, however, more important factors which must be weighed:

1. *Volume of Work*: Where the volume of work is so small that the machine cost per unit of output would be excessive, the machine should not be purchased unless other gains, such as speed of output or elimination of peak-loads, outweigh the primary expense.
2. *Accuracy*: Where accuracy is of prime importance, a machine designed to include automatic balancing features may be justified on this one feature alone since much office expense is devoted to checking functions. In determining the need for accuracy a very careful look should be taken at its cost, not only on a proposed machine installation, but also under the present method. The cost of obtaining accuracy may be far beyond its benefits. Accountants no longer insist on presenting financial statements expressed to the last cent. On some inventories, the control cost may be more than the inventory value. Wherever the cost of a checking operation exceeds the value of the errors eliminated, it is false economy to spend the money unless there are other worth-while considerations.
3. *Speed of Output*: In instances where some financial advantage is to be gained by advancing the date of completion of a task, machines can produce profitable end-results, even though the cost per unit of output may outweigh the cost by manual effort. Cash discount on payables might be saved or receivables collected more rapidly. Dangerous trends in manufacturing costs or in market conditions might be detected sooner so that corrective measures could be applied before it was too late.
4. *Job Cost Reduction*: The analysis might determine that the machine will produce at a lower cost per unit than a manual operation. Too often the decision will be made on this basis alone. There is a further study that should be made. What is to become of the time formerly spent on the manual operation? Unless this available time is used

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to advantage, the net result to the organization may be that no saving has been made. It is particularly important to plan in advance for use of the freed time if the present personnel are to use the machine, because there is a very human tendency to adopt a slower pace in order to fill in time for which work has not been provided. Once the slower pace has been established, it is frequently difficult to add additional duties.

When careful study discloses the profitability of a machine application, the problem of selection must then be solved. In some instances, a choice must be made between various types of machines; in other instances the choice must be between manufacturers of one type. The problem of selection is of great importance and unwise choice might endanger the whole plan.

The factors demanding consideration are:

1. *Operating Speed:* The manufacturer's rated speed of operation alone is not enough but frequently this is the only aspect considered. Most machines cannot produce faster than the input of the operator. On some machines, the make-ready time will be greater than that of the operating cycle.
2. *Simplicity of Operation and of Maintenance:* The more gadgets a machine contains the more likely it is to cause trouble, and trouble never seems to happen except at peak-load times or when a rush job is in process.
3. *Flexibility:* It pays to use highly-specialized equipment where the volume of work is sufficient to keep that equipment busy. If this is not possible, a multi-purpose machine can often be made to pay by scheduling it to perform a number of different jobs. In the latter instance, the ease with which the machine can be moved must be considered.
4. *Operator Training Time:* The shorter the time in which this is possible, the greater the profit obtainable. Not only must the usual operator be trained, but also understudies and replacements to fill the gaps caused by absences, promotion, or to meet increased production schedules.
5. *Adaptability to the Present System:* Frequently, the entire system must be re-tailored to fit the peculiarities of a machine, and this could be a substantial expense, to be avoided where possible. Also, if the installation is a particularly difficult one, it may be necessary to run both the old and new system for a trial period. Obviously, it is decidedly advantageous to have both systems on a parallel basis.

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6. *Cost*: This may be the most important item or it may be relatively unimportant, depending upon the value placed on the use of its output. In either case, it must be determined as accurately as possible. Its consideration involves these elements: (a) Initial cost of the machine itself; (b) Interest on the investment if the installation is a costly one; (c) Maintenance cost; (d) Cost of forms and supplies used with the machine; (e) Expected life of the machine; (f) Trade-in value; (g) Possibility of early obsolescence through new developments; (h) Space required; (i) Operator's salary, including employee "fringe" benefits which in many organization are a substantial percentage of salary.

After a decision on these elements has been made, the next step may be the choice of manufacturer. Here, good use can be made of the experience of other users, particularly if those other users are fellow-members of a trade or professional association. The general reputation of the manufacturer must be considered, together with his service policy. Finally, the manufacturer's representatives can be most helpful. An indicative trend is the fact that manufacturers of the more complicated machines now require their representatives to have accounting or business management skills. Usually, these representatives have had a great deal of experience in many industries, under varying conditions, and it is to their advantage to develop an installation that will be profitable to the user. Naturally, their interest is not entirely philanthropic, nor should it be.

Management's responsibilities do not end with the successful installation of a machine application. Continued high level volume and quality of work are not obtainable unless the machine is kept in good operating condition. Failure to maintain it properly can be a costly mistake. The maintenance programme begins with the operator, who should be trained to handle it carefully, to keep it cleaned at all accessible points, and to report promptly any operating difficulties. Periodic inspection by a qualified service organization is essential. The service is rarely performable by the user because of the technical skill required and because of the cost of keeping a fully-qualified man occupied full-time. The service may be performed by the manufacturer or by an independent service organization. Whichever is used, the quality and cost of the service must be weighed.

Those responsible for the machine operation should have a good knowledge of the manner in which it does its work, and its optimum capacity. Since many machines are limited by the operator's efficiency, output often can be increased by developing short-cuts in the machine operation, or by pre-preparation of the data used by the operator. The goal should be to arrange the work so that the operator spends a minimum amount of time performing non-operating functions.

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Finally, there are intangible opportunities in machine applications. The output usually is readily measurable and so assists in the vital job of developing clerical work measurements. The standardization and work simplification that can and should accompany a machine application may prove to be very profitable.

The Future of Mechanization in the Office

So far a cursory review has been presented of the past and present status of mechanization in the office and of the principles which should be followed in determining the profitability of machine applications.

While it is true that attempts are being made to further the state of mechanization in the office, nevertheless, it is also true that progress has been slow. An indication of the extent of machine applications in the office to-day can be obtained from employment figures. The 17% proportion in 1952 of office workers in industry comprised 11,000 office appliance operators, 139,000 stenographers and typists, and 416,000 clerical types. In other words, only 1 in 51 was a machine operator, excluding stenographers and typists, and of these machine operators a substantial portion would be operators of non-electrical apparatus.

The large number of stenographers and typists employed in industry, 1 in 4 clerical workers being in this group, illustrates the vast possibilities for cost reduction in the non-computing area of office work. The output of even a very skilled stenographer, a few hundred characters per minute, is painfully slow in comparison with the lightning speeds obtainable through electronics.

The office appears to be on the verge of a revolutionary change, a change comparable in its effect to the Industrial Revolution which ended the days of craftsmanship and began the machine era. The agency which will cause this upheaval is the modern science of electronics. It is already at work in the production field. The photo-cell "electric eye" is used as a counting device, as a measurer of colour changes, as a means of controlling movements of pieces of apparatus. Television replaces many inspectors in factory operations by permitting one man to view a number of inspection points from a distant location. It is used in banks for instantaneous comparison of signatures and other banking functions. It has a variety of uses in mass training, in the transmission of written matter, in communications.

In the public utilities field, electronics made possible the inter-city dialing system which eliminates the long-distance operator and permits the caller to dial directly a number in a distant city, and also automatically computes the cost of the call. Development work is being done on the operation of machines by the mere sound of a voice. Already there is exploration of what is called "automation", or the completely automatic factory which will result in "push-button" controlled production.

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The office cannot afford to lag behind the factory in applying mechanization principles, as it has up to now. The need for reducing office costs, for remaining competitive in one's own industry, coupled with the ingenuity of the electronics engineer, will compel the office to adopt these new techniques, depending, of course, upon the size of the office operations.

The chief features of the electronic computer are its ability to store-up a great mass of data which it can recall, compare, or compute at any time according to instruction, and the fabulous speeds with which it performs these operations. These features are also the bases of punched card equipment. The machine's "memory" consists of the card from which information can be used repetitively, and its speed of operation is greatly in excess of manual operations. The new electronic marvels are further developments of the punched card and for some applications will continue to use cards or tape.

The capacity to store or "remember" data, however, has been increased fantastically by storing it either electronically in vacuum tubes in the form of electrical impulses or on tape. This capacity is again supplemented by the ability to make use of the information with the speed of light, coupled with an incredible increase in the speed of computation. Incidentally, the so-called "electronic brain" does not employ complicated mathematical procedures. It performs all its mathematical functions by continuous addition or continuous subtraction.

The following statistics are typical of the speed of operation of electronic computers:

Multiplying — 50, 14 digit numbers per second (42,000 digits per minute.

Accumulating, Adding, Subtracting — 210,000 digits per minute.

Memory Capacity — Over 400,000 digits.

Complete Scanning of a List of Mathematical Items — 100,000 digits in 3 seconds.

Input — 30,000 digits per minute.

Output — Up to 24,000 digits per minute.

Effect on Office Employees

What effect will this technological change have on the office worker? The machine will dispense with many manual operations, and the workers performing those operations will be replaced by machine-tenders. It would seem that the skills required for the new group will be less exacting than those required for the manual operations. On the

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other hand, the growing need for greater managerial skills indicates, at the opposite extreme, a class of office people of professional calibre. Instead of the many strata of occupations and skills now found in the office, rising gradually from the office boy to the top executive, there will probably be a marked distinction between the relatively unskilled machine-tender and the trained interpreter and planner who will use the machine's output.

Not only will there be the problem of changing skills in the office, there may be, also, the problem of relocation of large numbers of office people displaced by machines. If the growth of the national economy will not absorb these people, a social problem will arise, and under our free enterprise system, management has social responsibilities.

Student Section . . .

Solutions by A. V. HARRIS, C.A., R.I.A.

ADVANCED COST ACCOUNTING — PAPER II — 1953 EXAMINATION

QUESTION II (16 marks)

The X Manufacturing Company manufactures a product by the name of SARDER. Work-in-Process accounts are charged at actual and credited at standard. The company records all possible variations monthly in separate accounts and transfers the balance in these accounts directly to cost of sales at the end of the fiscal year. From the following information submit Journal Entries, with explanatory data to record the operations for the month of January:

Budgeted Overhead Expense — \$3,000.00.

Budgeted Direct Labour hours for the month — 5,000 hours.

Units of production completed during the month of January — 250.

Work-in-Process Inventory January 1st — nil.

January 31st — 60 units.

Material Consumed — 100%.

Direct Labour and Manufacturing Expense — 50%.

Transactions for the month of January were as follows:

Purchases of materials: 8,000 feet @ 0.50.

Purchases of supplies: \$700.00.

Materials consumed as per requisition (actual cost): 10,000 feet @ 0.50.

Supplies consumed: \$600.00

Labour cost: Direct: 5,300 hours @ 0.75.

Indirect: \$800.00.

Manufacturing expenses:

Sundries \$500.00

Insurance 30.00

Depreciation 100.00

Taxes 40.00

Sales for the month — 200 units @ \$50.00 per unit.

The Company's Standard Cost Sheet for one unit of Sarder was as follows:

Materials	30 feet @ .50	\$15.00
Labour	20 hours @ .75	15.00
Manufacturing Expense	20 hours @ .60	12.00
		<u>\$42.00</u>

STUDENT SECTION

SOLUTION TO QUESTION II

1. Stores		\$4,700.00	
Accounts Payable			\$4,700.00
To record actual cost of direct materials and supplies			
2. Work-in-Process Materials		\$5,00.00	
Mfg. Expenses		600.00	
Stores			\$5,600.00
To record Materials and supplies used in production			
Materials 10,000 x 0.50	\$5,000.00		
Supplies	600.00		
	<u>\$5,600.00</u>		
3. Payrolls		\$4,775.00	
Accrued Payrolls			\$4,775.00
To record Payrolls: Direct and indirect			
Direct Labour 5,300 h. x 0.75	\$3,975.00		
Indirect Labour	800.00		
	<u>\$4,775.00</u>		
4. Work-in-Process Labour		\$3,975.00	
Mfg. Expense		800.00	
Payrolls			\$4,775.00
To distribute Payrolls: Direct Labour	\$3,975.00		
Indirect Labour	800.00		
5. Mfg. Expenses		\$ 670.00	
Accounts payable			\$ 500.00
Prepaid Insurance			30.00
Reserve for Depreciation			100.00
Accrued Taxes			40.00
Vouchering Mfg. Expenses — Sundries	\$ 500.00		
Monthly Adjustments for Others	170.00		
6. Work-in-Process — Mfg. Expenses		\$2,070.00	
Mfg. Expenses			\$2,070.00
To Transfer Actual Mfg. Expenses to Work-in-Process Account			
7. Finished Goods		\$10,500.00	
Work-in-Process — Materials			\$3,750.00
Work-in-Process — Labour			3,750.00
Work-in-Process — Mfg. Expenses			3,000.00
Materials, 250 units x \$15.00 =	\$3,750.00		
Labour 250 units x 15.00 =	3,750.00		
Mfg. Expense 250 units x 12.00 =	3,000.00		
8. Accounts Receivable		\$10,000.00	
Sales			\$10,000.00
To Record Sales: 200 units x \$50.00			
9. Cost of Sales		\$8,400.00	
Finished Goods			\$8,400.00
200 units sold x \$42.00			
10. No price variances in Materials.			
Standard \$0.50			
Actual \$0.50			
11. Material Quantity Variance		\$ 350.00	
Work-in-Process — Materials			\$ 350.00
Actual quantity 10,000 feet			
Standard quantity 9,300 feet			
	<u>700 x \$0.50</u>		
12. No Rate Variances in Labour			
Standard \$0.75			
Actual \$0.75			

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13. Work-in-Process — Labour	\$ 225.00	
Labour Quantity Variance		\$ 225.00
Standard Hours 5,600		
Actual Hours 5,300		
300 x \$0.75		
14. Work-in-Process — Mfg. Exp.	\$ 930.00	
Mfg. Expense Budget Variance		\$ 930.00
Budgeted \$3,000.00		
Actual 2,070.00		
\$ 930.00		
15. Work-in-Process — Mfg. Exp.	\$ 180.00	
Mfg. Exp. Efficiency Variance		\$ 180.00
Actual Hours 5,300		
Standard Hours 5,600		
300 x \$0.60		
16. Work-in-Process — Mfg. Exp.	\$ 180.00	
Mfg. Exp. Capacity Variance		\$ 180.00
Actual Hours 5,300		
Budgeted Hours 5,000		
300 x \$0.60		

ADVANCED COST ACCOUNTING — PAPER I — 1953 EXAMINATION

QUESTION II (15 marks)

The Drake Manufacturing Co. Ltd. does not manufacture at the full capacity of its plant. During September the costs of production were:

Direct Materials	\$20,000.00
Direct Labour	15,000.00
Manufacturing Expenses	30,000.00
	<u>\$65,000.00</u>

In the month of September production totalled 20,000 units, and the sales price per unit was \$4.00. The general administrative and selling expenses in the month were \$6,500.00.

The Company is offered a special order for 10,000 units, if it can be priced at \$3.00 per unit.

Examination reveals that, including the above order, the costs for the month would be:

Direct Materials	\$30,000.00
Direct Labour	22,500.00
Manufacturing Expenses	37,500.00
	<u>\$90,000.00</u>

REQUIRED

1. The Differential cost per unit.
2. Statement to show whether the Company should accept or decline the offer.

SOLUTION TO QUESTION II

	Without Contract	With Contract		Without Contract	With Contract
(1) Total Cost	\$65,000.00	\$90,000.00			
No. of Units	20,000	30,000			
Unit Cost	\$ 3.25	\$ 3.00			
Cost Differential		\$.25			
(2) Comparative Profit and Loss Statement for Period					
	Without Contract	Unit Cost	With Contract	Unit Cost	Contract
Sales	\$80,000.00	\$4.00	\$110,000.00	\$3.666	\$30,000.00
Cost of Sales	65,000.00	3.25	90,000.00	3.000	25,000.00
Gross Profit	\$15,000.00	\$.75	\$ 20,000.00	\$.666	\$ 5,000.00
Operating Expenses	6,500.00	.325	6,500.00	.216	
Net Profit	<u>\$ 8,500.00</u>	<u>\$.425</u>	<u>\$ 13,500.00</u>	<u>\$.45</u>	<u>\$ 5,000.00</u>

